his solution of salt and soda. Experiment shows that the salt-soda solution, whether warm or cold, may be kept for a long time without becoming infected, and that any bacteria which may be accidentally introduced into it perish after the lapse of a short time.

When injected subcutaneously or into a vein, salt-soda solution has a marked ability to produce leucocytosis, as the following table shows:

Intravenous injection, 7 cubic centimetres solution, increased leucocytes 3 times; duration, 7 days.

Intravenous injection, 2 cubic centimetres solution, increased leucocytes 1½ times; duration, 1 day.

Intravenous injection, 2 cubic centimetres solution, increased leucocytes 1¾ times; duration, 3 days.

Intravenous injection, 8 cubic centimetres solution, increased leucocytes 1¼ times; duration, 2 days.

The author makes the following claims for his solution: "It is preferable to ordinary water for the sterilization of dressings; it remains sterile for a long time; prevents the formation of adhesions, does not irritate the tissues, provokes marked leucocytosis, has positive chemiotactic action, and excites the bactericidal functions of the organism without injuring the tissues as do antiseptics."

Preparation of salt-soda solution. The strength of the solution is, NaCl. 7½ $^{0}/_{00}$ + $Na_2CO_3$ 2½ $^{0}/_{00}$. When made with distilled water, the solution is at first clear, but by the next day there is a slight deposit. When hot or boiled water is used there is a flocculent precipitate, which sinks rapidly; hydrant water gives a still greater precipitate, making the solution opalescent for twenty-four hours.—*Revue de Chirurgie,* May, 1902, p. 578.

**I. Heart Surgery.** By B. MERRILL RICKETTS, M.D. (Cin-

## THORAX AND ABDOMEN.

**I. Heart Surgery.** By B. MERRILL RICKETTS, M.D. (Cincinnati). Experimental physiology and surgery show what can be done in heart surgery. Twenty-five dogs were used in experi-

mentations; penetrating and non-penetrating wounds of the heart were made and closed with sutures of different material. Interrupted silk sutures were found to be the best. No especial aseptic precautions were taken, as all pathologic conditions were desired. The author found that the pericardium could be entirely removed without death resulting. Either one of the coronary arteries could be ligated at its base without producing death. In a certain class of cases he concludes that it is best to suture the pericardium to the chest wall that drainage may be perfect. It is ideal to suture during systole, but one will be satisfied to secure perfect suturing in systole or diastole. Even though the auricular is thinner than the ventricular wall, it may be sutured with equal success. Owing to this difference in thickness, the per cent. of penetrating wounds of the auricles is much greater than those of the ventricles.

The author is of opinion that the application of surgical principles in certain cases of aneurism of the heart will, no doubt, in the near future be accomplished by suture, electrolysis, or the injection of gelatin or something of a similar character. The removal of a certain class of foreign bodies, whether they have formed within or have entered from without, should, and no doubt will, be accomplished.

That a cardiac abscess should be incised and drained, he thinks, there can be no doubt. Tumors of a pedunculated character on the external surface of the heart can and should be removed. Pedunculated tumors within the cardiac chambers can also be successfully removed. Parasitic cysts (animal or vegetable) when upon the external surface of the heart or in its wall should be incised and drained. Mitral stenosis, hypertrophy, and dilatation of the heart will sooner or later find complete or partial relief within the domain of surgery.

Lacerated or incised, penetrating and non-penetrating wounds of the heart should be sutured. Suturing or any other surgical procedure should not be discontinued because the heart should

cease to pulsate. The work can and should be completed within a much shorter time on a quiescent heart. All means should be resorted to, while the suturing of the myocardium is being completed, to re-establish the heart's action.

Drainage of the pericardial sac is necessary in many cases of injury of the heart. Exploratory incision of the pericardial cavity and its contents has been shown by both experimental research and operations upon the living human body to be exceedingly rational, valuable, and justifiable.—AUTHOR'S ABSTRACT.

**II. Observations on the Sensibility of the Abdominal Cavity.** By PROFESSOR K. G. LENNANDER (Upsala). It was with the idea of investigating in how far the various portions of the peritoneum, parietal and visceral, are sensitive, and their varying degrees of sensitiveness towards different stimuli, that Professor K. G. Lennander undertook the subject in hand.

He gives a minute description of thirty cases in which he has used local anæsthesia, and in which he has had exact record taken of every operative procedure, and also the relation it had to the sensation it caused in the patient. The method used was generally as follows: One-half to three-quarters of an hour before beginning local anæsthesia, ¾-1 centigramme of morphia subcutaneously was administered; this was sometimes repeated. Then, shortly before beginning operation, 1 milligramme of strychnine (0.01 : 10 aqua dest.) and 2 grammes of camphor oil (1 : 4) were administered. This prophylactic stimulation of the heart just before operation he has used for six years, since he considers it of great benefit in weak patients or where the operation promises to be protracted.

A stenographer took down every step of the operation with notes on the sense perceptions of the patient. To obtain uniform estimation of the degrees of pain, three columns of observations are given, which are designated as "slight pain," *i.e.*, barely perceptible to patient; "pain," *i.e.*, when it was of unmistakable

intensity; "great pain," *i.e.*, when patient was given the choice to decide as to whether to go on with local anæsthesia or to take complete narcosis. The results were also interesting in showing the effects of referred pain, since the patient could not always locate the exact seat of pain unless it was very severe, nor bring it into association with provoking agent of pain.

The cases are divided into groups that illustrate the relative sensitiveness of (1) the parietal peritoneum and great omentum; (2) the parietal peritoneum and gall-bladder, liver, and adhesion between abdominal organs; (3) parietal peritoneum and ileum and diverticulum Meckelii; (4) vermiform appendix, cæcum, and lowest part of ileum; (5) uterus and adnexa; (6) stomach.

In relation to the small intestine and mesentery, the following observations were made:

(1) When several loops of intestine protruded through the abdominal opening, the patient experienced no sensation of disturbed location nor of pain.

(2) Firm pressure of the small intestine between thumb and forefinger produced not the slightest pain nor sensation *when the mesentery was not drawn on.*

(3) Firm pressure on the intestine between thumb and forefinger in two places and stretching the portion of gut lying between them caused no pain or sensation when the mesentery was not pulled.

(4) Pressure of the mesentery between the fingers without pulling on it caused no sensation nor pain.

(5) Tension on the mesentery between the fingers at two fixed points, without pulling on the posterior portion attached to the posterior abdominal wall, caused no pain or sensation.

(6) Slight tension on the mesentery directly forward caused pain that was referred to the region of the umbilicus.

Parietal peritoneum. Light palpation of the parietal peritoneum produced pain, which increased by stronger palpation, and this was correctly referred to the side on which the palpa-

tion was made. The pain also was produced even when the edges of the wound were not touched. Sponges and tampons could be introduced and withdrawn from the abdominal cavity without causing pain when care was taken not to touch the parietal peritoneum.

Removal of a Meckel's diverticulum and of the appendix caused no pain when cut, nor did the stumps when treated with chemical (silver nitrate stick) nor thermal (actual cautery) irritants.

Lennander's view of McBurney's point is also interesting. He says that he considers it to be the point where the lymph vessels of the appendix go over into the parietal peritoneum in the posterior portion of the abdominal cavity, and that the pain is produced by a local lymphangitis and lymphadenitis at this point. The *sub*serosa at this point on the posterior abdominal wall with its innumerable nerves becomes inflamed.

Tubercular peritonitis. In a case of tubercular peritonitis, the same reactions were found as in the healthy peritoneum in regard to pain and sense perception.

Liver and gall-bladder. The surface of the liver was found to be like the intestines, void of sensation, also the gall-bladder peritoneum. However, when the gall-bladder was sewn to the parietal peritoneum or was adherent, pain was produced through irritation of the latter.

Ovaries and uterus. In a laparatomy the ovaries and uterus were found to be void of pain when touched by the thermocautery. Pulling or tension on them, however, produced pain.

*Literature.*—In addition to his own observations, Lennander goes at length into a critical review, with abstracts, of the principal literature bearing on the subject, and gives numerous references all through the paper. He gives some interesting physiological observations from Weber, and also from Haller.

Toilet of the abdomen. Washing out the abdominal cavity with normal salt solution at 42° C. he says was not an unpleasant sensation to the patient.

*Conclusion.*—The parietal peritoneum is very sensitive to all operative procedures; but the intestinal canal, anterior border of the liver, gall-bladder, great omentum and serosa of the urinary bladder, and the parenchyma of the kidney are entirely non-sensitive for all operative procedures.—*Mittheilungen aus den Grenzgebieten der Medizin und Chirurgie,* Band x, Heft 1 and 2, pp. 38-104.

WILLIAM F. JELKE (Cleveland).

**III. Infection of the Lymph Glands in Carcinoma of the Pyloric Portion of the Stomach.** By DR. LENGEMANN (Breslau). This paper consists in

(1) A review of the small amount of work that has been done heretofore on the pathology of the lymph glands in this region.

(2) A short chapter on the anatomy and direction of the lymph streams from the three chief divisions of the stomach, *i.e.,* cardia, fundus, and pylorus.

(3) A summary of the pathological findings in each of the twenty cases from von Mikulicz clinic.

(4) A list of the literature bearing on the subject.

Since Heidenhain's work on the carcinoma metastases found in the axillary lymph glands secondary to amputatio mammæ and Wertheim's studies in the metastases occurring in connection with carcinoma uteri, great interest has been manifested in this means of spreading of cancer and its relations to recurrence. Borrmann, of this same clinic, says in his work on "The Growth and Methods of Spreading of Carcimona in the Walls of the Stomach," "Since we may assume that within the stomach walls the growth and spread of the tumor mass occur by direct continual infiltrating strands which infiltrate by fine processes along the line of the lymph channels into the muscle, subserosa, and finally reach the omentum, then the metastases into the lymph glands which are principally situated in the omentum are by direct continual growth."

The findings in sections cut from 189 lymph glands obtained in twenty cases of carcinoma of the stomach showed seventy-nine with metastases, 110 free from cancer, or 42 and 58 per cent. respectively. The course of the lymph streams from the stomach follows, in general, the three principal blood supplies to that organ, and hence most of the lymph glands are found in the bend of the lesser curvature. The glands situated in this region showed the greatest tendency to the formation of metastases. Also, in cases where *ulcer of the stomach* simulated a carcinomatous appearance, and in some of these the macroscopical appearance of the two is very similar, a study of the lymph glands aided in forming a diagnosis and prognosis by distinguishing the two.

Dr. Lengemann strongly recommends the radical removal of all carcinomatous glands, together with the portion of the pyloric end removed in one piece, by removing the uniting portion of omentum in all cases of carcinoma of the stomach, when the condition of the patient will permit.—*Archiv für klinische Chirurgie,* Band lxviii, Heft 2, pp. 382-418.

WILLIAM F. JELKE (Cleveland).

## GENITO-URINARY ORGANS.

**I. Use of Adrenalin as a Local Hæmostatic in Urethral and Bladder Operations.** By PROFESSOR DR. A. VON FISCH. In cases of vesical hæmaturia in which the preliminary irrigations always cause a renewal of the hæmorrhage, and thus prevent cystoscopy, the author has filled the bladder with 100 to 150 cubic centimetres of a solution of adrenalin, 1 : 10,000, leaving the liquid three to four minutes in the bladder, and only then beginning the irrigations. By taking this precaution, all hæmorrhage was avoided, or else it was so slight that the clearing up of the contents of the bladder was readily effected and the cystoscopic examination could be executed with perfect success.

In operating on tumors of the bladder, after opening the bladder above the pubis, several applications of the adrenalin solution,